



Journal of Biological Sciences

ISSN 1727-3048

science
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Umbilical Cord Prolapse

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Abstract: To utilize obstetric risk factors and perinatal outcomes of pregnancies complicated by umbilical cord prolapse. Birth records of 76 cases with umbilical cord prolapse and 760 randomly selected controls were reviewed retrospectively. Statistical analysis was performed using logistic regression models. Prolapse of the umbilical cord complicated 0.32% (n = 76) of all deliveries included in the study (n = 23818). Multiparity was more common in patients with umbilical cord prolapse (88.2-58.3%, p<0.0001). Umbilical cord prolapse occurred in breech presentation in 17 cases (22.4%) and in transverse presentation in 3 of the cases (9.2%). The occurrence of breech presentation among the control cases was 1.2% and of the transverse lie was 0.9%. Fetuses with umbilical cord prolapse had lower fetal weight; Particularly, fetal weight less than 2500 g was a significant risk factor (9.2-3.9%, p<0.05). We also found that Premature Rupture Of Membranes (PORM) (OR = 0.92; 95%CI = 0.81-0.99), and polyhydramnios (OR = 0.91; 95% CI = 0.84-0.97) were risk factors for umbilical cord prolapse. The newborns that were delivered after umbilical cord prolapse graded lower Apgar scores less than 7 at 5 min (9.2-0.6%, p<0.0001). Abnormal fetal presentation, multiparity, low birth weight, polyhydramnios and Premature Rupture Of Membranes(PORM), are risk factors for umbilical cord prolapse.

Key words: Umbilical cord prolapse, pregnancy, women, outcomes

INTRODUCTION

Umbilical cord prolapse is a rare adverse obstetric emergency that can result in fetal morbidity or mortality and increases maternal risk. The reported incidence of umbilical cord prolapse varies from 1 in 162 to 1 in 714 births (0.14-0.62%) (Uygur *et al.*, 2002; Kahana *et al.*, 2004; Boyle and Katz 2005). Prior studies have suggested that conditions in which there is a low fitness between the fetus and the maternal pelvis during labor increase the risk of umbilical cord prolapse. These conditions include malpresentation in approximately 50% of cases (Katz *et al.*, 1988; Koonings *et al.*, 1990), low birth weight (less than 2500 g) in 30-50% of cases (Panter and Hannah, 1996; Usta *et al.*, 1999) and prematurity (Roberts *et al.*, 1997). Others have found an association between umbilical cord prolapse and maternal factors such as multiparity, polyhydramnios and obstetrical manipulations such as labor induction and scalp electrode application (Levy *et al.*, 1984; Brown *et al.*, 1991). Yla-Outinen *et al.* (1985) have reported that compared with nulliparas, women giving birth to their subsequent babies seemed to run twice as great a risk for the occurrence of umbilical cord prolapse. However, Critchlow *et al.* (1994) have

reported that there was no association of cord prolapse with hydramnios or multiparity once birth weight was taken into account. In previous reports the perinatal mortality ranged from 36 to 345/1000 (Murphy and MacKenzie, 1995; Sunoo and Bhattacharayya, 2003). The basic aim of present study, was to evaluate the incidence, risk factors and perinatal outcomes of pregnancies complicated by umbilical cord of prolapse.

MATERIALS AND METHODS

A population-based study was performed, comparing all deliveries complicated by umbilical cord prolapse to deliveries without this complication. The study population consisted of all deliveries that occurred between 2001 and 2003 at our hospitals in Zanjan, Iran. Data were retrieved from our perinatal database. The data collected included: parity, gestational age, birth weight, PORM and Polyhydramnios. The following obstetric risk factors were analyzed: Polyhydramnios, Parity, malpresentations, placental previa, premature rupture of membranes (PROM). The following birth outcomes were evaluated: Apgar scores at 5 min less than 7 and birth weight less than 2500 g. Statistical analyses were

performed with the SPSS package (Version 11.5). To test the statistical significance of the categorical variables, the chi-square test or Fisher's exact tests were used. Variables were entered by backward, stepwise selection into the model. The criterion for selection was $p < 0.05$. Odds Ratios (OR) and their 95% Confidence Interval (CI) were calculated from the regression coefficient.

RESULTS AND DISCUSSION

During the study period, 76 cases with umbilical cord prolapse were diagnosed while there were 23818 deliveries. The incidence of umbilical cord prolapse was 1 in 313.4 births (0.32%). The mean maternal age of the umbilical cord prolapse cases was 26.38 ± 0.51 while the average age of the controls was 26.19 ± 0.46 ($p = 0.7$). Of the 76 cases with umbilical cord prolapse, 67 were multiparas (88.2% vs. 58.3%); $p < 0.0001$). Umbilical cord prolapse occurred in vertex presentation in 52 (68.4%), in breech presentation in 17 (22.4%) and in transverse presentation in 7 cases (9.2%). The occurrence of breech

presentation among the control cases was 1.2% and the transverse lie was 0.9% ($p < 0.0001$). The odds ratio for preterm delivery (< 37 weeks of gestation) associated with umbilical cord prolapse was 0.81 and the 95%CI was 0.72 -0.92; $p < 0.0001$. Of the 76 fetuses with umbilical cord prolapse, 9.2% had a fetal weight less than 2,500 g when compared with 2.4% for fetuses in the control group ($p < 0.01$). In the umbilical cord prolapse group, polyhydramnios was determined in seven patients (9.21%), while this ratio was 0.4% in the control group ($p < 0.0001$). Table 1 presents obstetric risk factors of the two groups. In Table 2 shown fetal outcomes and labor characteristics.

Umbilical cord prolapse continues to be a catastrophic and stressful event not only for the patient but also for the physician. Pregnancy is transformed instantly into an acute emergency, usually requiring cesarean section. However, early diagnosis and prompt delivery usually result in a satisfactory outcome. Therefore, the obstetrician should be aware of the conditions of pregnancy that are associated with umbilical cord prolapse, to identify patients at risk. The incidence of the cord prolapse in some previous studies has been reported to vary between 0.14 and 0.62% (Uygun *et al.*, 2002; Kahana *et al.*, 2004; Boyle and Katz 2005). The incidence in this study (0.32%) is in agreement with those studies. The incidence does not appear to have changed in the last half of the century. Previous studies have examined various risk factors related with umbilical cord prolapse. Fetal malpresentation is well known to be associated with an increased risk of umbilical cord prolapse (Woo *et al.*, 1983; Uygun *et al.*, 2002). In a study reported by Koonings *et al.* (1990) breech presentation accounted for 36.5% of the umbilical cord prolapse cases, while in the control group this ratio was 3%. In this study group, breech presentation accounted for 22.4% and transverse lie for 9.2%. However in the control group, the incidence of breech presentation was 1.0% and the transverse lie was seen in 0.1% of the cases (Grimovsky and Boyed, 1999). The relationship between abnormal fetal presentation and increased risk of umbilical cord prolapse is confirmed in our study as well. The association between low birth weight and multiparity and occurrence of umbilical cord prolapse has been confirmed repeatedly by previous studies (Roberts *et al.*, 1997; Uchida *et al.*, 1997; Faiz *et al.*, 2003). Yla Outinen *et al.* (1985) found that babies with birth weight less than 1250 g had a 19-fold increase and multiparous mothers a two fold increase in risk. In this study, 3.9% of the control group had a fetal weight of less than 2,500 g when compared with 9.2% for fetuses in the umbilical cord prolapse group. Also, multiparity accounts for 88.2% in

Table 1: Association of fetal presentation, parity and gestational age with umbilical cord prolapse

Risk factor	Cases (n = 76)		Controls (n = 760)		Odds ratio	95% CI	p-value
	n	%	n	%			
Presentation							
Vertex	52	68.4	744	97.9			
Breech	17	22.4	9	1.2			
Transverse	7	9.2	12	0.9	a		$p < 0.0001$
Parity							
Primiparas	9	11.8	311	41.7			
Multiparas	67	88.2	449	58.3	1.20	1.01-1.03	$p < 0.0001$
Gestational age							
< 37 weeks	17	22.4	38	5.0			
> 37 weeks	59	77.6	722	95.0	0.81	0.72-0.91	$p < 0.0001$

a: Risk estimate statistics can not be computed

Table 2: Labor Characteristics and fetal outcomes of patient with umbilical cord prolapse

Characteristics	Cases (n = 76)		Controls (n = 760)		Odds ratio	95% CI	p-value
	n	%	n	%			
Birth weight							
< 2500 g	7	9.2	30	3.9			
> 2500 g	69	90.8	730	96.1	0.94	0.87-0.91	$p < 0.05$
Apgar 5 min							
< 7	7	9.2	5	0.6			
> 7	69	90.8	755	99.4	0.75	0.60-0.94	$p < 0.0001$
Polyhydramnios							
Yes	7	9.2	3	0.4			
No	69	90.8	757	99.6	0.91	0.84-0.97	$p < 0.001$
PORM							
Yes	18	23.7	130	17.1			
No	58	76.1	630	82.9	0.92	0.81-0.99	$p < 0.001$
Cesarean section							
Yes	68	89.5	350	46.1			
No	8	10.5	410	53.9	0.19	0.11-0.36	$p < 0.0001$

the umbilical cord prolapse group, but for 58.3% among the control cases. The clinician should perform an examination to rule out the umbilical cord prolapse. Abnormal fetal presentation, low birth weight and multiparity are well-known risk factors for Umbilical cord prolapse. But there are some other factors that can be overlooked, such as polyhydramnios and amniotomy. In some studies, artificial rupture of membranes was shown not to increase the risk of umbilical cord prolapse (Usta *et al.*, 1999; Nizard *et al.*, 2005). Recently, in a report by Kahana *et al.* (2004) polyhydramnios has been found to be an independent risk factor for umbilical cord prolapse (OR = 3.0; 95%, CI = 2.3-3.9). Present finding in this study (OR = 0.91; 95%, CI = 0.84-0.97) is in agreement with that study. Umbilical cord prolapse is an obstetric emergency that threatens the life and well being of the fetus. The risk factors associated with this condition are abnormal fetal presentation, multiparity, low birth weight and preterm delivery. These are well-known risk factors and the association between these risk factors and umbilical cord prolapse has been demonstrated many times. We showed some other characteristics such as polyhydramnios, Premature Rupture Of Membranes (PORM) and placenta previa can be risk factors for umbilical cord prolapse.

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